Amendments to the Claims:

Please amend the claims as indicated in the following listing of claims, which replaces all prior versions and listings of claims in the application.

Listing of Claims:

1. (Currently Amended) A method for forming an optical waveguide on a substrate in a process chamber, the method comprising:

depositing an undercladding layer over the substrate;

forming a plurality of separated optical cores over the undercladding layer, the plurality of optical cores defining a sequence of gaps having a width between 1 and 2 μm and an aspect ratio between 2:1 and 7:1; and

depositing an ~~a first~~ uppercladding layer over the plurality of cores and within the gaps with a high-density plasma process that includes simultaneous deposition and sputtering components and having a deposition-sputter ratio between 3:1 and 10:1 to fill the gaps, wherein the deposition-sputter ratio is defined as the ratio of a sum of a net deposition rate and a blanket sputtering rate to the blanket sputtering rate for the high-density plasma process~~; and~~

~~depositing a second uppercladding layer over the first uppercladding layer with a PECVD process to completely fill the gaps~~.

2. (Currently Amended) The method recited in claim 1 wherein depositing the ~~first~~ uppercladding layer comprises:

flowing an oxygen-containing gas and a silicon-containing gas into the process chamber to produce a gaseous mixture;

generating a high-density plasma from the gaseous mixture; and

depositing a silicate glass layer over the at least one core with the high-density plasma.

3. (Original) The method recited in claim 2 wherein a flow rate of the oxygen-containing gas is more than 1.8 times a flow rate of the silicon-containing gas.

4. (Original) The method recited in claim 3 wherein the flow rate of the oxygen-containing gas is greater than 175 sccm and the flow rate of the silicon containing gas is between 80 and 110 sccm.

5. (Original) The method recited in claim 4 wherein the oxygen-containing gas comprises O_2 and the silicon-containing gas comprises SiH_4.

6. (Currently Amended) The method recited in claim 2 wherein depositing the ~~first~~ uppercladding layer further comprises flowing an inert gas into the process chamber with a nonzero flow rate less than 200 sccm.

7. (Currently Amended) The method recited in claim 2 wherein depositing the ~~first~~ uppercladding layer further comprises flowing a fluorine-containing gas into the process chamber with a flow rate between 10 and 20 sccm.

8. (Original) The method recited in claim 7 wherein the fluorine-containing gas comprises SiF_4.

9. (Currently Amended) The method recited in claim 2 wherein depositing the ~~first~~ uppercladding layer further comprises flowing a phosphorus-containing gas into the process chamber with a nonzero flow rate less than 30 sccm.

10. (Original) The method recited in claim 9 wherein the phosphorus-containing gas comprises PH_3.

11. (Currently Amended) The method recited in claim 2 wherein depositing the ~~first~~ uppercladding layer further comprises flowing a boron-containing gas into the process chamber with a nonzero flow rate less than 20 sccm.

12. (Original) The method recited in claim 11 wherein the boron-containing gas comprises BF_3.

13. (Original) The method recited in claim 2 further comprising applying an RF source power to the process chamber, the RF source power having a power density between 6 and 30 W/cm^2.

14. (Previously Presented) The method recited in claim 2 further comprising applying an RF bias power to the substrate, the RF bias power having a nonzero power density less than 16 W/cm^2.

15. (Previously Presented) The method recited in claim 2 wherein depositing the silicate glass layer comprises depositing the silicate glass layer at a pressure less than 12 millitorr.

16. (Currently Amended) The method recited in claim 1 wherein depositing the ~~first~~ uppercladding layer comprises:

flowing O_2 into the process chamber with a flow rate greater than 175 sccm;

flowing SiH_4 into the process chamber with a flow rate between 80 and 110 sccm such that a ratio of the O_2 flow rate to the SiH_4 flow rate is greater than 1.8:1;

flowing SiF_4 into the process chamber with a flow rate between 10 and 20 sccm;

flowing Ar into the process chamber with a nonzero flow rate less than 200 sccm;

generating a high-density plasma from the gases flowed into the process chamber; and

applying an RF bias power to the substrate, the RF bias power having a nonzero power density less than 16 W/cm^2.

17. (Previously Presented) The method recited in claim 1 further comprising:

etching a portion of the uppercladding layer in the gaps defined by the plurality of optical cores; and

depositing a second uppercladding layer over the etched uppercladding layer.

18. (Original) The method recited in claim 1 wherein the high-density plasma process comprises a high-density plasma electron-cyclotron-resonance process.

19. (Canceled).

20. (Currently Amended) The method recited in claim 1 wherein the ~~first~~ uppercladding layer has a refractive index between about 1.4443 and 1.4473 at a wavelength of 1550 nm.

21. – 29. (Canceled).